WHAT IS CLAIMED IS:

1. A method of forming a thin-film fuel cell electrode, comprising:

providing a substrate and at least one deposition device;

developing a deposition characteristic profile having at least one porous layer based on pre-determined desired electrode properties; and

forming a film in accordance with said deposition characteristic profile by depositing material from said deposition device while varying a relative position of said substrate in relation to said deposition device with respect to at least a first axis.

2. The method of claim 1, wherein forming said film further comprises varying a power supplied to said deposition device.

3. The method of claim 1, wherein forming said film further comprises varying a bias of said substrate to a deposited material.

5. The method of claim 1, wherein forming said film further comprises varying an applied magnetic field.

6. The method of claim 1, wherein varying said relative position comprises advancing said substrate along a substrate advancement path.

7. The method of claim 1, wherein varying said relative position comprises varying a speed with which said substrate passes said deposition device.

8. The method of claim 1, wherein varying said relative position comprises varying a distance at which said substrate passes said deposition device.

9. The method of claim 8, wherein varying said relative position further comprises varying a speed with which said substrate passes said deposition device.

10. The method of claim 1, wherein varying said relative position comprises traversing said substrate back and forth past said deposition device.

11. The method of claim 10, wherein varying said relative position further comprises varying a distance in multiple directions.

12. The method of claim 11, wherein varying said relative position further comprises varying a speed with which said substrate passes said deposition device.

13. The method of claim 12, wherein said deposition characteristic profile comprises at least composition gradient profile and at least one morphological gradient profile.

14. The method of claim 13, wherein said morphological profile comprises alternating dense film layers and porous film layers having nano-chambers.

15. The method of claim 14, wherein said deposition device comprises a sputter gun.

16. The method of claim 1, further comprising providing a second deposition device and depositing a second material from said second device onto said substrate while varying the relative position of said substrate in relation to said second deposition device with respect to at least a first axis.

17. The method of claim 16, wherein forming said film further comprises varying a power supplied to said deposition device.

18. The method of claim 16, wherein forming said film further comprises varying a bias of said substrate to a deposited material.

19. The method of claim 16, further comprising varying a distance between said deposition devices.

20. The method of claim 16, wherein forming said film further comprises varying an applied magnetic field.

21. The method of claim 16, wherein varying said relative position comprises advancing said substrate along a substrate advancement path.

22. The method of claim 16, wherein varying said relative position comprises varying a speed with which said substrate passes said deposition device.

23. The method of claim 16, wherein varying said relative position comprises varying a distance between said deposition devices.

24. The method of claim 23, wherein varying said relative position further comprises introducing the use of shutter to selectively block at least a portion of a material expelled from at least one of said deposition devices.

25. The method of claim 16, wherein varying said relative position comprises traversing said substrate back and forth past said deposition device.

26. The method of claim 25, wherein varying said relative position further comprises varying a distance in multiple directions.

27. The method of claim 26, wherein varying said relative position further comprises varying a speed with which said substrate passes said deposition device.

28. The method of claim 27, wherein said deposition characteristic profile comprises at least composition gradient profile and at least one morphological gradient profile.

29. The method of claim 28, wherein morphological profile comprises alternating dense film layers and porous film layers having nano-chambers.

30. The method of claim 29, wherein said deposition devices comprise sputter guns.

31. The method of claim 16, further comprising varying the distance between said deposition devices.

32. The method of claim 16, wherein forming said film comprises introducing the use of second and third deposition devices.

33. The method of claim 32, wherein forming said film comprises varying a speed with which said substrate passes said deposition devices.

34. The method of claim 33, wherein forming said film comprises varying a substrate advancement path of said substrate with respect to said deposition devices.

35. The method of claim 1, wherein said electrode comprises an anode.

36. The method of claim 35, wherein said anode is formed from a group consisting of nickel, platinum, Ni-YSZ, Cu-YSZ, Ni-SDC, Ni-GDC, Cu-SDC, Cu-GDC.

37. The method of claim 1, wherein said electrode comprises a cathode.

38. The method of claim 37, wherein said cathode is formed from a group consisting of silver, platinum, samarium strontium cobalt oxide (SSCO, $Sm_xSr_yCoO_{3-\delta}$), barium lanthanum cobalt oxide (BLCO, $Ba_xLa_yCoO_{3-\delta}$), gadolinium strontium cobalt oxide (GSCO, $Gd_xSr_yCoO_{3-\delta}$), lanthanum strontium manganite ($La_xSr_yMnO_{3-\delta}$) and lanthanum strontium cobalt ferrite ($La_wSr_xCo_yFe_zO_{3-\delta}$) and mixtures thereof.

39. A thin-film fuel cell electrode formed by:

providing a substrate and at least one deposition device;

developing a deposition characteristic profile based on pre-determined desired electrode properties; and

forming a compositionally-graded film in accordance with said deposition characteristic profile by sputtering material from said deposition device while varying a relative position of said substrate in relation to said deposition device with respect to at least a first axis.

40. The electrode of claim 39, further comprising providing a second deposition device and sputtering a second material from said second device onto said substrate while varying the relative position of said substrate in relation to said second deposition device with respect to at least a first axis.

41. The electrode of claim 39, wherein forming said film further comprises varying a power supplied to said deposition device.

42. The method of claim 39, wherein forming said film further comprises varying a bias of said substrate to a deposited material.

43. The method of claim 39, wherein forming said film further comprises varying an applied magnetic field.

44. The method of claim 39, wherein varying said relative position comprises advancing said substrate along a substrate advancement path.

45. The method of claim 39, wherein varying said relative position comprises varying a speed with which said substrate passes said deposition device.

46. The method of claim 40, wherein varying said relative position comprises varying a distance between said deposition devices.

47. The method of claim 46, wherein varying said relative position further comprises varying a speed with which said substrate passes said deposition device.

48. The method of claim 40, wherein varying said relative position comprises traversing said substrate back and forth past said deposition device.

49. The method of claim 48, wherein varying said relative position further comprises varying a distance in multiple directions.

50. The method of claim 49, wherein varying said relative position further comprises varying a speed with which said substrate passes said deposition device.

51. The method of claim 50, wherein said deposition characteristic profile comprises at least composition gradient profile and at least one morphological gradient profile.

52. The method of claim 51, wherein morphological profile comprises alternating dense film layers and porous film layers.

53. The method of claim 52, wherein said porous film layers comprise nano-chambers.

54. The method of claim 40, further comprising varying the distance between said deposition devices.

55. The method of claim 40, wherein forming said film comprises introducing the use of second and third deposition devices.

56. The method of claim 55, wherein forming said film comprises varying a speed with which said substrate passes said deposition devices.

57. The method of claim 56, wherein forming said film comprises varying a substrate advancement path of said substrate with respect to said deposition devices.

58. The method of claim 39, wherein said electrode comprises an anode.

59. The method of claim 58, wherein said anode is formed from a group consisting of nickel, platinum, Ni-YSZ, Cu-YSZ, Ni-SDC, Ni-GDC, Cu-SDC, Cu-GDC.

60. The method of claim 1, wherein said electrode comprises a cathode.

61. The method of claim 60, wherein said cathode is formed from a group consisting of silver, platinum, samarium strontium cobalt oxide (SSCO, $Sm_xSr_yCoO_{3-\delta}$), barium lanthanum cobalt oxide (BLCO, $Ba_xLa_yCoO_{3-\delta}$), gadolinium strontium cobalt oxide (GSCO, $Gd_xSr_yCoO_{3-\delta}$), lanthanum strontium manganite ($La_xSr_yMnO_{3-\delta}$) and lanthanum strontium cobalt ferrite ($La_wSr_xCo_yFe_zO_{3-\delta}$) and mixtures thereof.

62. A system for forming thin-films, comprising:
means for variably advancing a substrate;
at least one means for variably depositing material on said substrate; and
means for forming at least one layer having nano-chambers.

63. The system of claim 62, further comprising means for forming a compositional gradient on said substrate.

64. The system of claim 63, further comprising means for forming a morphological gradient on said substrate.

65. The system of claim 64, further comprising means for forming nano-pores in said morphological gradient.

66. A fuel cell, comprising:
an electrolyte located between thin film electrodes having at least one porous layer and the porous layers are of a thickness of between 10-500 nanometers.

67. The fuel cell of claim 66, wherein said porous layers are between 30-80 nanometers in thickness.